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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/885,487	06/20/2001	Ka Hung Derek Wong	SC01014AS	4430
23125	7590	03/24/2005	EXAMINER	
FREESCALE SEMICONDUCTOR, INC. LAW DEPARTMENT 7700 WEST PARMER LANE MD:TX32/PL02 AUSTIN, TX 78729			AGDEPPA, HECTOR A	
			ART UNIT	PAPER NUMBER
			2642	

DATE MAILED: 03/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/885,487	Applicant(s) WONG ET AL.	
	Examiner Hector A. Agdeppa	Art Unit 2642	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 June 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 11,12,14 and 15 is/are allowed.
- 6) ☒ Claim(s) 1,4-6,8,13,16,18,20 and 21 is/are rejected.
- 7) ☒ Claim(s) 2,3,7,9,10,17,19,22 and 23 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 June 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>6/20/01</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

1. Claims 8, 13, 16, and 18 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claims 8, 13, 16, and 18 recite the limitation that a first current source of the Q limiter is always disabled. However, support for this limitation is not found anywhere in the specification. In fact, the opposite is described in P. 8, lines 30 – 31 and P. 11, lines 9 – 11 of the specification for the present invention, i.e., that the first current source is always enabled.

For examination purposes, examiner will assume the first current source as described in the specification (P. 11, lines 9 – 11 and Fig. 8) for the present invention is always enabled.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

2. Claims 1 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicant's admitted prior art in view of US 6,532,270 (Bell et al.)

As to claims 1 and 21, applicant's admitted prior art in the background of the invention section of the specification for the present invention teaches that conventional image rejection mixers have a first mixer that receives an RF input signal and a first local oscillator (LO) signal and generates a first intermediate frequency (IF) output signal, wherein the first LO signal is $\sin \omega_{lo}t$, a second mixer that receives the RF input signal and a second LO signal and generates a second IF output signal, wherein the second LO signal is $\cos \omega_{lo}t$, and wherein $\omega_{lo}t$ is a frequency signal generated by a local

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oscillator, and a summer connected to the first and second mixers for receiving the first and second IF output signals and generating a combined IF output signal. (Prior Art Fig. 3 of applicant's drawings for the present invention, P. 2, lines 11 – 31 of applicant's admitted prior art)

What applicant's admitted prior art does not teach is wherein the second LO signal is $-\cos \omega_{lo}t$. However, Bell et al. teaches an image reject mixer 110 with selectable hi or lo side injection, wherein two 90 degree phase shifter units are applied to first and second LO input signals to first and second mixers 113 and 114 which could result in a phase shift of 90 degrees between the inputs such as $\sin \omega_{lo}t$ and $-\cos \omega_{lo}t$. (Fig. 5, Col. 3, lines 25 – 52 of Bell et al.) It would have been obvious for one of ordinary skill in the art at the time the invention was made to have combined applicant's admitted prior art and the teachings of Bell et al. inasmuch as Bell et al. teaches a progression of the image reject mixer art which allow for selectable high or low side injection. Moreover, applicant's admitted prior art and Bell's circuitry are the same except for the advantageous introduction of the 2 phase shifter units before summing the output of the mixers 113 and 114. Therefore, Bell's teaching is clearly applicable to conventional image rejection mixers as taught by applicant's admitted prior art.

3. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over applicant's admitted prior art in view of US 6,532,270 (Bell et al.) and further in view of US 5,625,307 (Scheinberg)

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Applicant's admitted prior art and Bell et al. have been discussed above. What they do not explicitly teach is using differential circuits to implement the first and second mixers. However, such is old and well known in the art as taught by Scheinberg. (Col. 4, lines 18 – 21 of Scheinberg) It would have been obvious for one of ordinary skill in the art at the time the invention was made to have used differential circuits as mixers inasmuch as Scheinberg's teachings show that differential circuits are merely one way in which mixers may be implemented. The fact that differential circuits are known, as taught by Scheinberg, to be used as mixers provides the necessary motivation in and of itself to do so.

4. Claims 5, 6, 16, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicant's admitted prior art in view of US 6,532,270 (Bell et al.) and further in view of US 5,271,041 (Montreuil).

As to claim 5, applicant's admitted prior art and Bell et al. have been discussed above. What they do not explicitly teach is the limiter circuits used to provide the input signals to the mixers. However, the use of I and Q limiter circuits as claimed is old and well known in the art as taught by Montreuil. (Abstract, Fig. 10, Col. 10, lines 4 – 34, Col. 11, lines 19 – 32 of Montreuil) It would have been obvious for one of ordinary skill in the art at the time the invention was made to have used such limiters inasmuch as this is standard procedure. Applicant's admitted prior art for example, merely does not go into detail about how the input signals are provided, but clearly, they must be provided somehow, this method being, as discussed, old and well known.

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As to claim 6, see the rejection of claims 1 and 5.

As to claim 16, see the rejection of claim 5. Note also that at least one current source must always be enabled or else no signal would result, and having one current source enabled and one disabled is merely a design choice or preference to obtain the desired differential signal. Also note that Montreuil teaches limiters having phase inverting and non-inverting sides. (Col. 12, line 57 – Col. 3, line 19, Col. 15, lines 3 – 22 of Montreuil)

As to claim 20, see the rejection of claims 1 and 16.

Allowable Subject Matter

5. Claims 11, 12, 14, and 15 are allowed.

6. The following is an examiner's statement of reasons for allowance:

The invention as now claimed is not disclosed or rendered obvious in view of the prior art of record. The prior art of record fails to teach or suggest, alone or in combination, the recited Q mixer, Q limiter, I mixer, I limiter, summer combination with an additional phase shift circuit connected between the Q mixer and summer for generating a phase lag signal of 90 degrees. This allows avoiding steering of intermediate frequencies for selectable high or low side injection. Moreover, the prior art of record fails to teach or suggest, alone or in combination, the recited combination and connection of elements making up the claims Q and I limiter circuits.

7. Claim 13 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 1st paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

8. Claims 2, 3, 7, 9, 10, 17, 19, 22, and 23 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. The following is an examiner's statement of reasons for allowance:

The invention as now claimed is not disclosed or rendered obvious in view of the prior art of record. The prior art of record fails to teach or suggest, alone or in combination, the recited first and second mixer, and summer combination with an additional phase shift circuit connected between the first mixer and summer for generating a phase lag signal of 90 degrees. This allows avoiding steering of intermediate frequencies for selectable high or low side injection. Moreover, the prior art of record fails to teach or suggest, alone or in combination, the recited combination and connection of elements making up the claims first and second / Q and I limiter circuits.

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10. Claims 8 and 18 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 1st paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

11. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US 4,696,017 (Masheff et al.) teaches quadrature signal generator having digitally-controlled phase and amplitude correction using I and Q limiters. US 5,633,898 (Kishigami et al.) teaches automatic frequency control apparatus for and FSK receiver using first and second limiters. US 5,861,781 (Ashby) teaches a single sideband double quadrature modulator using two mixers and a summer combination with mixer inputs having a 90 degree phase lag (sin and cos). US 5,943,370 (Smith) teaches a direct conversion receiver again using a first and second mixer and summer combination with a 90 degree phase lag.

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13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hector A. Agdeppa whose telephone number is 571-272-7480. The examiner can normally be reached on Mon thru Fri 9:30am - 6:00pm.

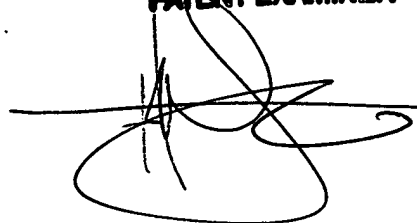
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ahmad F. Matar can be reached on 571-272-7488. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Hector A. Agdeppa
Examiner
Art Unit 2642

H.A.A.
March 17, 2005

HECTOR A. AGDEPPA
PATENT EXAMINER

A handwritten signature in black ink, appearing to be 'H.A. Agdeppa', written over the printed name and title.